REMARKS

The Office Action mailed September 8, 2005 has been reviewed and carefully considered. Claims 14-20 remain pending in this application. Claims 14 and 15 have been amended. Claims 21-24 have been added.

Claims 14 and 15 have been amended to define a first and a second beam path direction through the crystal associated with a first and second configuration of the crystal, respectively, wherein the second direction is the reversed direction of the first direction. The reversed direction is disclosed on page 6, 3rd paragraph, of the present invention. The reversed, second direction and the corresponding second configuration of the crystal are further described by the phrase: "the second configuration being obtained by rotating the crystal by 180 degrees with respect to the first arrangement about an axis perpendicular to the horizontal cross section of the crystal" for claim 14, and "the second configuration being obtained by rotating the crystal by 180 degrees with respect to the first arrangement about an axis perpendicular to the plane of the ring cavity" for claim 15.

Claim 14 has been amended to include the first step of claim 15, i.e. providing an optical pumping source.

Claimed in Claims 14 and 15 is a "Brewster-cut" crystal, as disclosed on page 6, 2nd paragraph. For clarification, the first direction of incidence on the Brewster-cut crystal has further been defined by the amendment "wherein the normal of a first entrance surface of the Brewster-cut frequency conversion crystal forms a Brewster angle with the beam of the optical pumping source". The second direction is correspondingly defined as "wherein the normal of a second entrance surface of the Brewster-cut frequency conversion crystal forms a Brewster angle with the beam of the optical pumping source".

Claim 15 has been amended to claim a "unidirectional ring cavity comprising a single Brewster-cut frequency conversion crystal, a single prism and a mirror arrangement", as visible from Fig. 1 of the present invention.

Independent claim 21 has been added. A cubic crystal as of the embodiment described in Fig. 2 of the present invention is claimed. In one embodiment the crystal is uncoated during the

determination of the preferred direction, as disclosed on page 4, 3rd paragraph of the present specification. The crystal is coated *after* completion of the determination.

Independent claim 22 has been added. The subject-matter of claim 22 differs from claim 14 in step (e), the marking of the crystal after the determination of the preferred beam path direction on prior to the amplification The marked crystal is disclosed on page 5, first paragraph, of the present specification.

Dependent claims 23-24 have been added claiming the marking step of claim 22, dependent on claims 14 and 15, respectively.

Examiners Action

Claim Rejections – 35 USC § 103

Reconsideration of the above-identified application, as amended, and in view of the following remarks is respectfully requested.

In the outstanding Office Action the Examiner rejected claims 14-17, 20 as being anticipated under 35 U.S.C. §102(b) over Zanger et al (U.S. Patent No. US 6,317,449) or Stappaerts (US 5,341236).

Claim 14, as amended, provides a method for producing laser radiation in which a Brewster-cut crystal is placed in a first configuration into a beam path of an optical pumping source. The first output power is then measured. The beam passes through the crystal in a first direction. Then, the crystal is arranged in a second configuration, wherein the beam passes through the crystal in a second direction being the reversed direction of the first beam path direction, the second configuration being obtained by rotating the crystal by 180 degrees with respect to the first arrangement about an axis perpendicular to the horizontal cross section of the crystal, i.e. the crystal is flipped over. In both configurations, the angle of incidence is the Brewster angle. The power is then measured again, followed by the determination of which of the two directions has the higher output power. For amplification, the crystal is subsequently used in the better of the two beam path directions.

Zanger does nowhere disclose a first and a second crystal configuration, wherein the crystal is rotated by 180 degrees with respect to the first arrangement about an axis perpendicular

to the horizontal cross section of the crystal. Zanger rotates the crystal within the paper plane, i.e. in the cavity plane (col. 5, lines 60-65), i.e. parallel to the horizontal cross section. The beam never passes the crystal in the reversed direction. Rotating a Brewster-cut crystal by 180 degrees in a manner disclosed by Zanger would lead to a second incident angle, which would be different to the first incident angle, i.e. in contrast to the present invention as claimed in claim 14. This also holds for Fig. 8 cited by the Examiner.

In fact, due to the different rotation disclosed by Zanger, the rotation is limited to a few degrees (col. 6, line 20). Therefore, Zanger rather teaches away from a rotation larger then a few degrees. According to Zanger, precise compensation can only be obtained at the expense of increased resonator losses (Fig. 8). The present invention is directed to a method which increases the output by rotating the crystal without any compensation losses, since the beam path itself does not change, but only the direction of the beam through the crystal is reversed.

Furthermore, it should be pointed out that the aim of the invention of Zanger is directed to tunable frequency conversion. The frequency of the laser changes and the crystal is rotated in order to adapt to such frequency change. In contrast, the present invention is directed to a method for increasing the output power at a given, constant frequency.

For the foregoing reasons applicants submit that independent claim 14 is patentable over Zanger.

Claim 15 claims in addition to claim 14 a unidirectional ring cavity. The rotation axis can now be defined as being perpendicular to the ring plane, in contrast to Zanger. Since all the features of claim 14 are present in claim 15, claim 15 is also patentable over Zanger.

Furthermore, the new claims 21 and 22 include the same features as claim 14 and are also patentable over Zanger. Note that Zanger does not disclose the additional features of claims 21 and 22, i.e. the coating of a cubic crystal after the determination of the preferred direction, and the marking of the crystal after the determination has been completed, respectively.

Applicants also like to point out that the amendment relating to the second direction which is the reversed direction of the first beam path direction, obtained by rotating the crystal by 180 degrees, was already presented in an subsequently allowed claim and, thus, is no new matter which would necessitate a new search.

Lastly, the Examiner rejected claims 14-17, 20 as being anticipated over Stappaert. The

Examiner did not provide any citations of the specification of Stappaert to support the rejection. Regardless, Applicants submit that in view of the amendments to claims 14 and 15 and similar to the arguments presented above in connection with the Zanger reference, Stappaerts also does not anticipate the presently amended claims 14, 15 and their dependent claims 16, 17, and 20.

In the outstanding Office Action the Examiner rejected claims 18 and 19 as being obvious by Zanger et al (U.S. Patent No. US 6,317,449) in view of Gries et al (US 6,633595).

Neither Zanger nor Gries disclose the rotation of the crystal perpendicular to the cavity plane. Since claims 18 and 19 dependent on claim 15, claims 18 and 19 are patentable over Zanger in view of Gries.

Summary

For the foregoing reasons applicants submit that independent claims 14, 15, 21 and 22 are patentable over the art of record. Claims 16-20 and 23 depend from independent claim 15, Claims 24 depends from independent claim 21, thus are patentable for the same reasons that claims 15 and 21are patentable. Applicants submit that the application is now in condition for allowance and passage to issuance is requested.

If any additional fees or charges are required at this time in connection with the application, authorization is hereby given to charge our Patent and Trademark Office Deposit Account No. 14-1263.

Respectfully submitted,

Christa Hildebrand

Christa Hildebrand,
Reg. No. 34,953
Attorney for Applicants
Norris McLaughlin & Marcus P.A
875 Third Avenue – 18th Floorl
New York, N.Y. 10022
Telephone: (212)808-0700
Facsimile: (212)808-0844